A) Amendments to the specification

Please amend the second paragraph beginning on page 1 as follows:

2. Description of the prior art: U.S. Patent Numbers 2,231,535; 2,261,255; 2,721,516; 3,146,705; 3,388,574; and 5,524,535 disclose intermittent motion type decorating machines using an indexing drive system to impart intermittent traveling motion to an endless chain conveyor provided with workpiece carriers for supporting workpieces such as bottles made of glass or plastic. U.S. Patent No. 3,388,574 discloses horizontally orientated bottle carriers arranged in a side-by-side relation on a conveyor chain and used for supporting each bottle in a horizontal orientation while intermittently moved along a path of travel through a decorating machine. Each bottle is supported at its opposite ends by clamping chucks. One chuck, rotated by a machine drive, is ~~temporally~~ temporarily connected with a crank arm on a journal extending from a bearing support. The ~~and the~~ other clamping chuck is resiliently moveable by a spring to release and resiliently ~~forced by a spring to~~ engage ~~and rotatably support~~ the bottle for rotation about a horizontal axis extending along the extended length of the bottle. The clamping chucks are supported on a base, which is secured to chain-links forming the endless conveyor chain extending along the path of travel of bottles through the decorating machine. The clamping force acting on the bottle by the clamping chucks is the only force retaining the bottle on the conveyor. The effect of inertia acting on the bottle in response to the intermittent motion at a given through put speed must be offset by the clamping force. However, the magnitude of the clamping force establishes a break away force for relative rotation between the bottle and the clamping chucks for registration of the bottle relative to the decoration cycle by the machine.

Please amend the first paragraph beginning on page 5 as follows:

The present invention further seeks to provide a workpiece steadying apparatus to alter the transfer speed of workpieces individually and consecutively from a delivery rate by a decorating transfer conveyor as received from the transfer operation carried out simultaneously with a reorientation of the workpiece. The change to the workpiece orientation, such when the workpiece comprises a bottle, has been carried out in the past as shown in United States Patent No. 3,648,821 in which a conveyor supplies the bottles in a vertical orientation to a point where they are orientated horizontally and transferred to a conveyor of a decorating machine. The bottles are decorated while horizontally orientated and then delivered from the decorating machine by a transfer device to a discharge conveyor. The transfer device orientates the bottles from the horizontal to the vertical for conveyance by the discharge conveyor. When the rate at which bottles are fed through the decorating machine increases, there is also ~~occurs~~ the need to ~~captivity~~ captivatingly hold the bottle ~~throughout each supply operation through~~ while supplied by the feed conveyor to the conveyor of the decorating machine and ~~through~~ while transported by the conveyor of the decorating machine to the delivery conveyor. Also, the motions necessary to grip and release the workpiece during these transferring operations must be executed with great precision to insure successful handling of the workpiece that necessarily requires that the workpiece be taken from the freestanding vertically, stable attitude, re-orientated to the horizontal and placed in a wholly confined driven conveyor and taken from the driven conveyor, re-orientated from the horizontal to again regain a free-standing vertically, stable attitude.

Please amend the second paragraph beginning on page 6 as follows:

It is a further object of the present invention to provide, in a decorating machine, horizontal workpiece carriers continuously advanced except at each of a plurality of spaced

decorating stations and a registration station wherein the latter establishes the registration of the workpiece orientation at a reduced clamping pressure on the carriers which is restored to a predetermined ~~claming~~ clamping pressure for receiving decoration at each of the subsequent decorating stations.

Please amend the first paragraph beginning on page 12 as follows:

The sprocket 23A, drive ~~change~~ chain 23C and sprocket 23E for supply conveyor 24A supply drive torque to a drive shaft 23G which is transferred by drive sprocket 23H through an idler shaft 23I having input and output sprockets connected by chains for driving a sprocket 23J mounted on a drive roller 23K. The drive roller 23K is mounted for rotation at a spaced site from an idler roller 23L to support an endless belt 24C moving at a constant rate of travel to advance undecorated bottles along the course of travel established by the conveyor belt. Drive shaft 23G is also provided with a drive gear meshing with a drive gear 23M on an idler shaft on which there is also mounted a sprocket for a drive chain 23N used to provide torque to an input shaft for a drive 23P. The drive output gear of the drive 23P is mounted to the end of a timing screw 25 having a helical groove 25A for controlling the advancing movement of the bottles by the conveyor as will be described in detail hereinafter.

Please amend the third paragraph beginning on page 13 as follows:

The belts 17A and 19A extend to gear drives 27 and 29, respectively, having output shafts secured to rotate cams 31 and 32 (Figures 1, 3 and 4). The cams 31 and 32 are formed with closed cam tracks 31A and 32A also known as face grooves or positive cams. Bottles are decorated at each decorating station in an identical fashion by initiating screen travel when a bottle arrives at the decorating station. Figure 4 illustrates the cam tracks 31A and 32A of the respective cams. Each cam track is ~~are each~~ constructed to form two bottle decorating

cycles each separated by a screen dwell cycle. More specifically, cam track 31A consists of a screen dwell cycle 31B, bottle decorating cycle 31C, screen dwell cycle 31B', ~~1B,'~~ and a bottle decorating cycle 31C'. Cam track 32A consists of a screen dwell cycle 32B, bottle decorating cycle 32C, screen dwell cycle 32B,' and a bottle decorating cycle 32C'. In the first bottle decorating cycle, the decorating screens at each decorating station P1 and P2 are linearly displaced in one direction during which decoration is applied to a bottle at each decorating station. After these bottles are decorated, the screens remain stationary during screen dwell cycles and then the screens are reciprocated in the opposite direction during which decoration is applied to succeeding bottles at each decorating station. The cam tracks 31A and 32A define the precise occurrence of events with respect to the movement of the bottles by the workpiece conveyor 12 since the cams 31 and 32 and the workpiece conveyor are interconnected in the same drive train and driven by the same main drive motor 14. Each cam has a follower in the respective cam track to pivot an oscillating drive output at each of the decorating stations as will be discussed in detail hereinafter. The belt 18A driven by the first line shaft 15 extends to a pulley 20B mounted on a rotatably supported shaft having a gear 28 meshing with a gear 33. Gears 28 and 33 form a speed reduction relationship. Gear 33 is mounted on an intermediate shaft 34 supported by pillow blocks and having a pulley 35 provided with a belt 36 extending to a pulley 37 mounted on a third line shaft 38.

Please amend the first paragraph beginning on page 15 as follows:

As best shown in Figures 3, 4 and 5 spaced apart horizontal carrier supply disks 52 and 53 are mounted on the inboard and outboard ends, respectively, of drive shaft 50 and spaced horizontal carrier return disks 54 and 55 are mounted on the inboard and outboard ends, respectively, of drive shaft 51. A pulley 56 is mounted on the third line shaft 38 and joined by a

drive belt 57 to a pulley 58 mounted on a drive shaft 59 extending horizontally above the drive shaft 51. Tension in the drive belt 57 is controllably set by using fasteners to secure a roller support arm 57A, Figure 3, rotatably supporting a slack adjusting roller 57B in a fixed position to arm 40 for establishing the position for roller 57B to impose a desired tension on belt 57. As shown in Figure 6, a drive pinion gear 60 is mounted on the horizontally extended end of drive shaft 59 and meshes with idler gears 61 and 62, which in turn mesh with idler gears 63 and 64, respectively. Idler gear 61 meshes with a drive gear 65 mounted on a support shaft of a barrel cam 66; idler gear 62 meshes with a drive gear 67 mounted on a support shaft of a barrel cam 68; idler gear 63 meshes with a drive gear 69 mounted on a support shaft of a barrel cam 70; and idler gear 64 meshes with a drive gear 71 mounted on a support shaft of a barrel cam 72. As shown in Figures 4 and 7, the barrel ~~cam~~ cams 66, 68, 70, and 72 are rotatably supported by bearings 73 carried on the support shafts at opposite ends of the barrel cams. The bearings 73 are mounted in suitable apertures formed in the vertically extending mounting plates 43 such that the barrel cams can rotate about horizontal axes with the axes of barrel cams 66 and 68 lying in a common horizontal plane and there below the axes of rotation of barrel cams 70 and 72 lie in a common horizontal plane. Each of the barrel cams 66, 68, 70 and 72 have a closed cam track 66A, 68A, 70A and 72A which is a continuous groove milled in the cam body engaged by a roller attached to a follower for executing movements by horizontal bottle carriers as will be described in greater detail hereinafter to provide continuous traveling motion until interrupted by a dwell period "D" provided for the printing operation.

Please amend the first paragraph beginning on page 18 as follows:

The horizontal bottle carriers are each sequentially transferred from an established positive driving relation with barrel cams 66 and 68 into a positive driving relation with

horizontal carrier disks 54 and 55 and transferred by horizontal carrier disks 54 and 55 into a positive driving relation with barrel cams 70 and 72 and thence from barrel cams 70 and 72 to a positive driving relation with horizontal carrier disks 52 and 53 and completing a conveyance cycle transfer from horizontal carrier disks 52 and 53 into a positive driving relation with barrel cams 66 and 68. The cams to disks transfer ~~are~~ of bottle carriers is always the same and the transfer of bottle carriers from disks to cams is always the same. The sequence of events for the transfer of bottle carriers from disks to cams is the reversal of the sequence of events for the transfer of bottle carriers from cams to disks. The bottle carrier transfer for one end of the bottle carrier is schematically shown in Figures 11A-11D for the disk 53 to barrel cam 68 via cam followers 95B and 75, and it is to be understood that the same relationship between disks 52, cam 66 and cam followers 74 and 95A at the end of the bottle carrier adjacent to the decorating machine.

Please amend the first paragraph beginning on page 23 as follows:

A feature of the present invention provides that the clamping pressure applied by the mouth piece 78 and base cup 77 against the bottle to hold the bottle in place on the horizontal carrier is substantially reduced to a nominal pressure which is only sufficient to maintain the position of the bottle on the horizontal carrier during the time the bottle is rotated at the registration station R. The release of the clamping pressure on the bottle greatly reduces the breakaway frictional driving force by the base cup 77 and the vitreous bottle material when the registration finger 16R drivingly engages in registration cavity and stops rotation of the bottle. The registration cavity has a reduced wall thickness that is vulnerable to fracture when impacted by the registration finger and the continuing force prevents rotation of the bottle while the gear 30B continues to rotate to a start indexing position. As shown in Figure 14 the diameter of gear

30B is ~~relative~~ relatively smaller than the diameter of gear 30C which produces a speed up relation causing the gear 30B to rotate through an angle ~~grater~~ greater than 360 degrees for each revaluation of gear 30C. This is necessary to assure that the rotation of the bottle stops at the same registration position to accommodate the random occurring position of the registration cavity in each bottle arriving at the registration station. The reduction to the clamping pressure is developed by a cam 30D supported in a cavity of a housing 30E by a vertically extending pivot shaft 30F secured the machine frame at a site to present a cam surface 30G protruding from a window opening in the housing into the path of travel by a cam follower 80A of a horizontal bottle carrier 76. The configuration of the cam surface 30G is designed to apply a resilient biasing force axially on the actuator shaft 80 at the exact location where the horizontal bottle carrier dwells during the registration process. The ~~resiliently bias~~ resilient force applied to the cam 30D is provided by a spring 30H seated at one end in the cavity of a cup shaped carrier 30J pivotally joined to a cantilevered arm section 30DA of the cam 30D and overlying the housing 30E. The free end of the spring 30H is retained by a threaded shaft 30K protruding into the spring's helical configuration sufficiently to maintain contact by a washer 30L position by a nut 30M. The shaft 30K is mounted on a bracket 30N by nut members 30P at opposite sides of the bracket. The nut members 30P are advanced along the end position of the threaded shaft and tightened against opposite sides of the bracket to establish the resilient biasing force necessary to reduce the clamping pressure to the desired magnitude. A bolt 30Q is in threaded engagement with the cantilevered arm 30DA and arranged to abut against the overlying face surface of the housing 30E. A locknut 30R is used to secure the bolt 30Q at a position, which limits pivotal displacement of the cam 30D by the spring 30H.

Please amend the first paragraph beginning on page 26 as follows:

Hand wheels 108 and 122 are used to select a desired stroke for the screen reciprocation to match the circumferential distance of the bottle, which is to be decorated. This matching relationship is critically significant because no relative motion between the screen movement and the bottle rotation can be accepted otherwise, smearing, or poor quality decorating will occur. As shown in Figure 8, squeegees 129 and 130 are carried by a support arm 131 in positions above the screens 116 and 118, respectively. The squeegee construction ~~is~~ per se is known in the art and is shown in United States Patent No. 3,172,357. Each squeegee includes a squeegee rubber 132 on the end portion of squeegee positioning cylinder operated pneumatically against the force of a return spring thereby to establish line contact between the screen assembly 116 and 118 and a bottle as the bottle is rotated in a synchronous speed with linear movement of the screens. The squeegees are adjustably located by fasteners engaged in a mounting slot 133 extending along the elongated length of the support arm 131.

Please amend the first paragraph beginning on page 38 as follows:

As shown in Figure 1 there is a segment of travel by a bottle gripper across a substantially vertical orientation zone 230 characterized by advancing movement of the bottle gripper in a substantially vertical orientation before and after the moment the bottle gripper engages the bottle with the axis A vertically orientated. As shown in Figure 26 the CONVEYOR CLEARING segment of travel is part of a zone 230 where the axis A of a bottle remains substantially vertical and is produced as the cam follower 219 of a bottle gripper travels ~~of~~ along cam track 172 from 0°to 45°which maintains the gripper in a substantially vertical orientation and with

advancing substantially horizontal movement across the terminal end portion of the conveyor 24A. Another part of the zone 230 is an APPROACH CONVEYOR segment occurring along can track 172 at about 45° prior to 0° by the bottle gripper movements causing a substantially vertical orientation of the bottle gripper before the moment when a bottle is engaged by the bottle gripper. The APPROACH CONVEYOR segment and the CONVEYOR CLEARING segment form the entire substantially vertical orientation zone 230. This course of travel by the bottle gripper is the result of rotary movement of the gripper about axis 165 and a pivotal displacement of the gripper by rod 216 in a vertically upward direction by the follower 219 movement along cam track 172. The bottle gripper enters the CONVEYOR ENTRY segment in a substantially vertical orientation due to the same rotary movement combined with the vertically downward movement produced by pivotal displacement of the gripper by rod 216 in a vertically downward direction by the follower 219 along cam track 172.

Please amend the first paragraph beginning on page 41 as follows:

Referring now to Figure 33, the bottle transfer 155 at the bottle unloading equipment U utilizes the cam 236 with cam surface 235 oriented in the manner of an opposite hand arrangement to that shown and described in regard to Figures 31 and 32. This opposite hand arrangement is characterized by a positioning of the cam 236 along the path of travel by a bottle carrier 76 at a site located before the bottle unloading station 154 which is to be compared with the positioning of cam 236 in the same manner along the path of travel by a horizontal bottle carrier at a site located before passage to the bottle loading station 154. At the bottle unloading station 154, the cam 236 has functioned to pivotally displace the pivotal carrier arms 205 and 213 in a direction away from the C-shaped carrier arm grippers 196 and the

carrier arm 198 before the horizontal bottle carrier ~~76arrives~~ 76 arrives at the unloading station. The ~~and thereby allow the~~ grippers ~~to~~ pass along opposite sides of a bottle while supported by a bottle carrier 76 approaching the bottle unloading station 154. Cam 86 operates to release the bottle at the unloading station at substantially the same time as cam follower 207 passes downwardly beyond cam surface 235 causing the pivotal carrier arms 205 and 213 to assume a supporting engagement with the bottle. The cam 226A supported by the shelf 227A along the side of delivery conveyor 24B operates to move the pivotal carrier arms 205 and 213 in a direction to release a bottle from support by the bottle transfer and conveyance by conveyor 24B. The release of the bottle by the bottle transfer for conveyance by delivery conveyor 24B occurs by the operating position of the cam surface 225A of cam 226A at the side of the conveyor to engage the follower 207 when the central axis A of a bottle is centrally disposed with respect to the width of the conveyor. The follower 207 pivots the carrier arm 205 and 213 forwardly in the direction away from the bottle and the gripper 196 is rotated by the bottle transfer away from the bottle as seen by the illustration of Figures 33A and 33B. A vertical bottle carrier 300 of a bottle steady apparatus 302 establishes supporting engagement with the bottle by the time ~~of~~ the bottle is released from the bottle transfer. Figures 33C and 33D illustrates two sequential separations between the bottle as advanced by the vertical carrier and the departing bottle transfer. The bottle is advanced linearly in the direction of conveyer 24B which displaces the bottle beyond the rotary path of travel by the bottle transfer. The bottle steady apparatus 302 is provided according to the present invention to reduce the spacing between ~~consecution~~ consecutive bottles delivered from the decorating machine by the bottle transfer and the apparatus is particularly useful to reduce the linear advancement speed that is necessary to accommodate a bottle-

decorating rate of, for example, 200, or more bottles per minute. It will be understood by those skilled in the art that the moment of inertia acting on each bottle is centered about axis 165 of the bottle transfer at the arrival site on the delivery conveyor and therefore is non-linear at the release site on the delivery conveyor 24A with respect to the direction of movement by the conveyor. The bottle steady apparatus 302 serves the additional function of dissipating the destabilizing forces acting on the bottle on the conveyor, which destabilizing forces can be very detrimental when the bottle unloading operations occur with continuous motion and capable of relatively high bottle throughput operating speed.

Please amend the first paragraph beginning on page 43 as follows:

Figures 33 - 36 illustrate the details of the construction of the vertical bottle steady carriers 300. Each carrier essentially includes a pusher arm 304 with a mounting arm secured by a bolt to a vertically arranged base plate 308 at a location so that the pusher arm can engage the lower base of a bottle at a site between the conveyer and gripper 196 when present. Pairs of upper and lower guide rollers 310 and 312 are mounted by bolts 314 to the base 308 at outwardly spaced locations from the face surface of the base plate 308 by spacer sleeves 316. A slide plate 318 carries parallel guide bars 320 having V-shaped edges protruding beyond the side edges of the slide plate and engaged within corresponding-shaped groves in the face surfaces of the rollers 310 and 312. The arrangement of parts is such that the plate moves vertically downward to displace a vertically biased mouthpiece 322 by a spring and slide rod mounted on the slide plate in supporting engagement with a bottle. As shown, the mouthpiece 322 is provided with a shallow protruding bevel edge 324 to receive and center the mouth of a bottle in the mouthpiece whereby the upper portion of the bottle is restrained and driven linearly by the vertical bottle carrier. The

mouthpiece 322 is slidably supported on one leg of an L-shaped arm 326 secured by bolts 328 to the slide plate 318 between the guide bars 320. The mouthpiece 322 is ~~lower~~ lowered into a engagement with the mouth of a bottle while the bottom of the bottle is seated onto a conveyer by a follower roller 330 mounted to the face surface of a slide plate 318 opposite to the guide bars 320. As shown in Figure 40, the follower roller 330 passes along an oval shaped cam 332 having a linear cam surface 334 located in a lower plane of two planes established to position the mouthpiece 322 in supporting engagement with the mouth of a bottle. A linear cam surface 336 located in the upper of the two planes establishes an inoperative location for the mouth piece 322 wherein the mouth piece is advance along the cam track at a elevation above the mouth of the bottle. The linear cam surfaces 334 and 336 are joined by transitional cam segments 338 wherein the follower roller moves between the two planes and thereby moves into and out of engagement with the mouth of the bottle. The bottle steady apparatus 302 further includes an oval shaped cam carrier plate 350, an oval shaped upper housing plate 352, and an oval shaped lower housing plate 354. ~~Extends~~ Extending from a base plate 356 is a support pedestal 358 provided with a flange for securing the pedestal at the central portion of the oval shaped lower housing plate 354. Three spacer columns 360 are used to rigidly secure the oval shaped lower housing plate 354 to the oval shaped upper housing plate 352. The upper oval shaped housing plate 352 rigidly supports an array of four upstanding and threaded spindles 361 that extend through apertures in the oval shaped cam carrier plate 350 and into threaded engagement with a corresponding array of four drive nut assemblies 362 (Figure 38) that are flange mounted to the upper surface of the oval shaped cam carrier plate 350. Each of the drive nut assemblies includes a sprocket 364 coupled by ~~a~~ an endless chain 366 that is also coupled with a drive

sprocket 368. The drive sprocket is secured to a vertical drive shaft rotatably supported by a flanged mounting on the oval shaped cam carrier plate. The drive shaft is joined with a crank arm 370 which is rotated to simultaneously rotate the four drive nut assembly 362 and thereby alter the elevation of the oval shaped cam carrier plate 350 and the cam 332 supported thereon to accommodate a particular height of a bottle between the conveyor and mouthpiece.

Please amend the first paragraph beginning on page 47 as follows:

The vertical bottle carriers are each sequentially transferred from an established positive driving relation with barrel cam 372 into a positive driving relation with return disks 376A and 376B and transferred by return disks into a positive driving relation with barrel cam 374 and thence from barrel cam 374 to a positive driving relation with supply disks 378A and 378B completing a conveyance cycle. The cams to disks transfers are always the same to maintain a continuous supply of vertical bottle carriers 300 for supporting and decelerating a bottle during initial travel of the bottle along the delivery conveyor 24B, i.e. negative acceleration, the deceleration to the linear speed is ~~accomplish~~ accomplished by the configuration of the closed cam track surface 372A shown in detail in Figure 41 the cam track follows a course of continuous deceleration which also functions to reduce the spacing between adjacent bottle carriers.

Please amend the second paragraph beginning on page 47 as follows:

As shown in Figure 1 the distances between consecutive vertical bottle carriers 300 progressively decreases as the carries move along the length of the barrel cam 372 and thereby decrease the speed of the bottle to such an extent that the forward speed of the bottle ~~matches~~ match the linear speed the conveyor. The carrier return discs rotate at different constant speeds which match the delivery and exit

speeds of the carriers at the ends of the barrel cams. The barrel cam 374 accelerates the ~~speeds~~ speed of the carriers thus increasing the ~~distant~~ distance between the carriers so that the carrier speed when ~~it~~ driven by the carrier supply discs 376 imparts a traveling motion corresponding to the velocity of the bottle at the handoff location between the unloading bottle transfer and the vertical bottle carrier at the entrance to the cam track of the barrel cam 374 where upon the cycle is completed. As shown in Figure 38 the drive sprocket 23R drives a sprocket 450 that is joined by the chain 452 to a sprocket on an input shaft of a cone worm drive 454. The drive 454 is connected through an overload clutch 456 to a drive shaft 458 that is mounted to rotate the supply discs 378A and 378B. A pulley mounted on shaft 358 is joined by a drive belt 460 to a pulley 462 mounted on a drive shaft 464 to rotate the return discs 376A and 376B. Details of a bevel gear drive for the barrel cams and disks are shown in Figures 42 and 43. Shaft 457 drives a spur gear 465 that meshes with a spur gear 466 mounted on a vertical drive shaft 467. A bevel drive gear 468 is mounted on shaft 467 and meshes with a bevel drive gear 468 mounted on a line shaft 470. The line shaft 470 drives spaced apart bevel gears 474 and 476, which in turn mesh with bevel gears 478 and 480, respectively, mounted on a drive shaft joined with the barrel cams 372 and 374, respectively.